# UNITED STATES PATENT OFFICE.

DAVID GESTETNER, OF TOTTENHAM HALE, LONDON, ENGLAND.

## MANIFOLDING, DUPLICATING, AND THE LIKE.

1,371,157. Specification of Letters Patent. Patented Mar. 8, 1921.

No Drawing. Application filed January 5, 1921. Serial No. 435,240.

*To all whom it may concern:*

Be it known that I, DAVID GESTETNER, a subject of the King of Great Britain and Ireland, and residing at Neo-Cyclostyle Works, Tottenham Hale, London, N. 17, England, have invented certain new and useful Improvements in and Relating to Manifolding, Duplicating, and the like, of which the following is a specification.

This invention relates to processes of reproduction or duplicating by the employment of a stencil formed upon Yoshino or like paper.

There are a large number of processes of producing stencils formed upon Yoshino or like paper, among which may be mentioned those involving the cutting, by means of a stylus or a typewriting machine, of a layer of a hardened gelatin composition supported upon such paper and in this connection it may be mentioned that it has been proposed to employ a gelatin composition to which a bichromate has been added as a coating for such paper.

It has also been proposed to produce stencils in like manner by cutting a coating or layer of resin or a similar substance as, for instance, shellac applied to the Yoshino paper support in the form of an alcoholic solution. The employment of gelatin or other glutinous bodies has also been proposed, in conjunction with a hardening agent in sizing papers used for photographic purposes, for strengthening the paper; and in the production of stencils formed by suitably perforating paper to form the stencil it has been proposed to treat the paper stencil with a solution of shellac in order to strengthen the paper and then with a view to further strengthening the edges of the paper stencil, to apply thereto a frame cementing the same in position by means of shellac.

In the production of stencils produced upon a porous support by exposing to the action of light a porous support provided with a coating of a composition as, for instance, gelatin treated with a bichromate, the solubility of which in a medium subsequently used as a developer is changed by such exposure, it has been proposed to employ a woven fabric as the support, but it has been found that entirely satisfactory results cannot be obtained in this way. It has therefore been proposed to use Yoshino or like paper as the final support, the pellicle of gelatin or the like being exposed on a temporary support and then after development being transferred to the Yoshino paper.

The object of the present invention is to provide an improved process of producing stencils by photographic means and improved stencil sheets for use in the process.

The process according to the invention comprises exposing a sheet of Yoshino or like paper coated with a light sensitive composition adapted by exposure to light to be changed in respect of its solubility in a liquid subsequently used as a developer to the action of light to produce thereon an image of the matter to be reproduced and treating the exposed sheet to remove the soluble portions of the coating.

According to the invention, Yoshino paper which has been treated with an agent acting as a size or otherwise in the capacity of a strengthening medium is employed in producing the stencil sheets in view of the fact that the strength of Yoshino and like papers is considerably reduced by wetting and that therefore its handling or manipulation in the production of stencil sheets in this way requires considerable care.

The agent employed as a strengthening medium will be chosen in accordance with the treatment to which the stencil sheet is to be subjected.

If the paper is, for instance, to be treated with a liquid it is desirable to employ materials adapted to improve the adhesion between the fibers which are insoluble in the liquid to the action of which the paper is to be subjected. Thus, for example, if the paper is to be subjected to the action of water or aqueous compositions it will be desirable to employ for impregnating the paper solutions of water insoluble bodies.

Solutions of water insoluble gums or resins are, generally speaking, suitable; thus, for instance, solutions of shellac, dammar, mastic, animi, copal, amber, colophony, india-rubber, for instance a solution of rubber in benzol or gutta-percha, may be employed, or a mixture of a number of substances, for instance, india-rubber, turpentine and shellac or any known marine glue.

Similarly, solutions of synthetic resins or resin-like compositions may be made use of.

Pyroxylin or celluloid solutions may likewise be used for impregnating the paper.

A solution of shellac in alcohol has been found to be suitable, the solution being pref-

erably dilute and containing, for example, only 3 to 5% of shellac.

In certain cases, it may be found desirable to employ materials as, for instance, albumen or phenol-formaldehyde condensation products which under suitable treatment may be rendered insoluble.

When the paper is not intended to be subjected subsequently to the action of water, a water soluble gum or other material may be employed for improving the adhesion between the fibers of the paper.

Thus, for instance, gum arabic, casein, albumin, starch, or starch esters may be employed.

Optionally the Yoshino paper may be mounted with the aid of a suitable adhesive body on a carrier; thus, for instance, Yoshino paper may be mounted on a paper possessing greater mechanical strength, or on a card in order to facilitate the treatment of the Yoshino paper with the colloid or in the development of the exposed colloid-treated Yoshino paper.

As a support, glazed paper may be employed, and as an adhesive a body or composition which, while insoluble in cold or warm water, is soluble in hot or will melt at a suitable temperature, may be made use of.

The invention also extends to stencil sheets comprising a sheet of Yoshino or like paper treated with a strengthening agent and a layer or coating of a light sensitive composition of the character above indicated thereon.

The porosity of the paper should not be materially reduced by the treatment with a strengthening medium as otherwise the passage of the ink through the stencil will be impeded, but should the porosity of the paper have been reduced, the sheet after exposure and development may be immersed in or otherwise treated with a solvent for the strengthening agent.

If desired, the sheet may be further strengthened by folding over its edges and cementing them down with an adhesive which is insoluble in the coating or in the developer. Alternatively, strips of fabric or paper may be cemented to the edges of the sheet or the edges may be coated or impregnated more heavily with the strengthening agent.

Further, the coated sheet may be mounted on a temporary support or carrier from which it may be detached in order that after exposure and development it may be used as a stencil.

The sheet treated with a strengthening agent after coating with, for instance, gelatin and sensitizing with a bichromate, is exposed to the action of light under the matter to be reproduced or a diapositive or negative thereof, or in any other way to produce thereon an image of the matter to be reproduced and then developed by means of warm water.

In this connection it may be stated that the development of the stencil is conveniently effected by placing it between two sheets of porous material as, for instance, fine muslin, lawn or wire gauze, mounted on frames and pouring the developing fluid first on one side and then on the other until all the soluble substance is washed away; the stencil may then be taken out from between the frames and hung up or placed upon a ferro-type sheet or other suitable support to dry.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:—

1. The process of producing stencils by photographic means which comprises exposing a sheet of Yoshino or like paper mounted on a temporary support or carrier and coated with a light sensitive composition adapted by exposure to light to be changed in respect of its solubility in a liquid subsequently used as a developer, to the action of light to produce thereon an image of the matter to be reproduced and treating the exposed sheet to remove the soluble portions of the coating.

2. A stencil sheet comprising a sheet of Yoshino or like paper treated with an agent acting in the capacity of a size or otherwise as a strengthening medium, provided with a coating of a composition adapted by the action of light to be changed in respect of its solubility in a medium used as a developer, and mounted on a temporary support or carrier, substantially as described.

In testimony whereof I have signed my name to this specification.

DAVID GESTETNER.